MEDICAL IMAGE ENHANCEMENT BASED ON CNN-FBB MODEL

ABSTRACT

Image enhancement aims to make certain image features more distinct and prominent. In certain MRI and CT images, contrast is very low so that it is difficult to distinguish lesion areas from normal tissue. In this paper, a new medical image enhancement model using Convolutional Neural Network (CNN) and Frequency Band Broadening (FBB) is introduced. The model is primarily divided into three parts- i) preprocessing image with curvelet transform and cycle spinning ii) image enhancement with CNN and FBB iii) image fusion algorithm which follows pixel-level fusion.

Curvelet transform is a multiscale directional transform that can handle curves more effectively than wavelet transform. In the preprocessing stage, image data undergoes denoising methods using curvelet and a soft threshold function has been adopted combining with cycle spinning. The preprocessing stage is followed by image enhancement stage, where CNN and FBB models are used. The CNN model is designed as a structure with four layers of convolution, in which each layer has its own function. The weights as well as bias of each layer are learnt by back propagation algorithm. The main method of FBB involves compression of time domain signal such that it can expand the frequency band in frequency domain. The final stage is the fusion of two enhanced images obtained from the previous stage. The most basic fusion is the pixel-level fusion. After fusion, the image exhibits more detailed information such as edges and texture.

Submitted to   Submitted by

Dr. G Murugaboopathi   Parvathy Jyothi

Professor   parvathyjyothi@gmail.com

Dept.of Computer Science and Engg